MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015 / 2016

TAL 7011 – ARCHITECTURE OF LARGE SOFTWARE SYSTEMS

(All sections / Groups)

18 MAY 2016
8:00 P.M. – 10:00 P.M.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 6 pages (including cover page) with 5 Questions only.
2. Attempt **ANY FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the Answer Booklet provided.

Question 1 (2 + 3 + 1 + 2 + 2 marks)

A Web-based Foreign Worker System is created by an agency to help the foreign workers to apply new permits or renew their permits easily. The system is designed to be user friendly so that the user would be able to learn the system easily. The system is to be used by the company employing the worker (employer), foreign worker, agency staff, and agency manager.

Among the main functions of the system are:

- allow the employers to add foreign workers, and apply permits on their behalf.
- allow foreign workers to apply for permits, and update their details.
- allow agency staff to be able to view worker details, and add new workers.
- allow agency manager to update the permit status, and print reports.

a) Using this scenario, explain the difference between software architecture and software design.

b) Explain any THREE possible influences to the architecture of the new system.

c) Based on the information given, write a quality attribute scenario for ONE of the following quality attributes:
   - Testability
   - Usability

d) Draw the quality attribute scenario diagram based on the description in Question 1(c).

e) Describe at least ONE possible tactic to achieve the quality attribute in Question 1(c).

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Question 2 (3 + 1 + 3 + 3 marks)

myVoice Sdn Bhd is a startup company that is developing a software for voice commands that accepts spoken commands and executes the commands. The software consists of a sequence of modules that accepts a spoken command as sound wave, processes the input into different parts and recognizes the parts into a command representation that gets executed by the operating system.

a) What is a software architectural pattern? Describe any FIVE contents of an architectural pattern.

b) Explain which software pattern would be suitable for the voice command software above.

c) Describe the architectural pattern identified in Question 2(b), giving illustration on how it can be applied to the abovementioned system.

d) The software consists of the following modules:

Voice input processing module (voice.exe)
Analyser module (analyser.exe)
Sound generator module (generate.exe)

Draw the deployment diagram for the system that contains these artifacts.

Continued ...

Question 3 (3 + 1 + 4 + 2 marks)

MyTransport is a ticketing company that is proposing a new multipurpose smartcard ticketing system that can be used in all types of public transports, such as buses, taxis, trains and light rail transit systems (LRT). The new system is implemented using a multipurpose smartcard as 'ticket' to pay for taking the different modes of transport. These transport services currently use different systems supplied by different vendors. These systems are fully implemented and have been used for a few years.

a) Explain the importance of software architecture document in such a large software system. Illustrate using at least TWO possible viewpoints of the software.

b) Describe how the users can be helped to find their required information from the software architecture document.

c) Using the scenario above, explain the following terms in Model Driven Architecture (MDA).

- Platform Independent Model
- Platform Specific Model

d) Give TWO benefits of using MDA to develop this software system.

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Question 4 (1 + 4 + 3 + 2 marks)

myInsurance Bhd is a rapidly expanding insurance company in Malaysia. It recently merged with another insurance company, myAssurance Sdn Bhd, in order to have a wider product range and enter another market section of the insurance business. You are appointed as the architect to re-design the existing systems in both companies and merge them into an enterprise software system that can support all the business processes.

Both companies have computerized Financial Systems in their Accounts Departments. myInsurance have another system for Human Resources and Marketing Departments, whereas myAssurance only have a Customer Relationship Management system to manage their sales and marketing functions. Each of these systems is supplied by different vendors. These systems are fully implemented and have been used for a few years.

a) From this scenario, what is the enterprise software architecture and why is it important to create it?

b) Briefly describe the enterprise architecture domains using this example.

c) Propose a suitable integration style to merge the systems described above. Draw a diagram to illustrate the merge systems. (Hint: You may assume each system can be separated into interface, logic, and database components)

d) Using an example from the given information, explain the importance of mapping objects and classes to architectural components.

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Question 5 (2 + 4 + 4 marks)

Faculty of Computing & Informatics is embarking on a project to develop an enhanced e-Learning system to provide a better online learning environment for its students. The new system will integrate with MMLS for existing features, and provide new forms of interactions for students to communicate with each other, lecturers and multimedia learning contents. Intelligent monitoring of student actions are proposed in this system so that context sensitive responses can be provided to the students based on their activities in the system.

a) Explain how Jacobson use case technique can be used to manage the complexity of this system.

b) Draw the use case diagrams to illustrate your answer in Question 5(a).

c) Explain how the following enterprise integration styles can be used to integrate the elements in this system:

- The database gateway style
- The desktop integration style

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